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U. S. DEPARTMENT OF AGRICULTURE

Circular No. 10—Radio. (Second Edition—Revised)

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

Forecast Division

Washington, D. C., May 15, 1925

DISTRIBUTION OF WEATHER INFORMATION, FORECASTS, AND WARNINGS BY NAVAL RADIO FOR THE BENEFIT OF MARINE AND AVIATION INTERESTS ON THE PACIFIC OCEAN AND COAST

(In cooperation with Office of Communications, Navy Department)

The Weather Bureau issues daily (Sundays and holidays included) bulletins containing weather reports, forecasts, and warnings for the benefit of marine and aviation interests in the eastern waters of the Pacific and in the States bordering on that ocean. These bulletins are broadcast from naval radio stations, and beginning January 1, 1925, will conform to the provisions of this circular.

All time referred to herein is 120th meridian, and its equivalent in GMT, unless specifically indicated.

MAJOR BULLETINS

These bulletins are broadcast from the San Francisco Naval Radio Station (call letters NPG) twice daily as follows:

Morning bulletin at 9 a. m. (1700 GMT) on a wave length of 7,000 meters (42.8 k. c.).

Evening bulletin at 7:30 p. m. (0330 GMT) on a wave length of 7,000 meters (42.8 k. c.) and 2,607 meters (115 k. c.), simultaneously.

The bulletins are divided into two parts and invariably begin with the letters USWB (U. S. Weather Bureau). The first part consists of upper air data and surface weather conditions, the latter being based upon observations taken at 5 a. m. and 5 p. m., except as follows: Alaskan observations are taken at 8 a. m. and 8 p. m., 135th meridian time; Honolulu observations at 8 a. m. and 8 p. m., Honolulu local time; Guam, Manila, China, and Japan observations at 6 a. m., 120 E. meridian time, the same day, and Midway observations at 6:30 p. m., Midway local time, of the preceding day.

Weather reports from ships in the North Pacific Ocean follow the reports from land stations, 4 a. m. reports being broadcast in the p. m. bulletin of the same day, and 4 p. m. reports in the a. m. bulletin of the following day.

The second part of the bulletin consists of a summary of general atmospheric pressure distribution over land and sea, including the locations of "high" and of "low" areas, and the barometer readings at their centers; wind and weather forecasts for Pacific offshore areas; storm warnings for these areas; and flying weather forecasts for each of three aviation zones (chart on page 4).

FIRST PART

Key-letters and stations

*NM	Nome, Alaska.	BS	Boise, Idaho.
*SPI	St. Paul, Alaska.	HL	Helena, Mont.
*DH	Dutch Harbor, Alaska.	LD	Lander, Wyo.
*TN	Tanana, Alaska.	WM	Winnemucca, Nev.
*EA	Eagle, Alaska.	R	Reno, Nev.
*KD	Kodiak, Alaska.	SLC	Salt Lake City, Utah.
*CV	Cordova, Alaska.	MD	Modena, Utah.
*JU	Juneau, Alaska.	*DV	Denver, Colo.
*SK	Sitka, Alaska.	GJ	Grand Junction, Colo.
*PR	Prince Rupert, B. C.	*SA	Santa Fe, N. Mex.
*KA	Kamloops, B. C.	*PH	Phoenix, Ariz.
TAT	Tatoosh Island, Wash.	YU	Yuma, Ariz.
†SE	Seattle, Wash.	*HO	Honolulu, T. H.
NH	North Head, Wash.	*MDI	Midway Island.
PD	Portland, Oreg.	*ED	Edmonton, Alberta.
RO	Roseburg, Oreg.	*CY	Calgary, Alberta.
EUR	Eureka, Calif.	*SC	Swift Current, Sask.
RB	Red Bluff, Calif.	*FMA	Manila, P. I.
SM	Sacramento, Calif.	*FGM	Guam.
†SF	San Francisco, Calif.	*FHO	Hongkong, China.
FN	Fresno, Calif.	*FSH	Shanghai, China.
SLO	San Luis Obispo, Calif.	*FBI	Bonin Island.
*PAR	Point Arguello, Calif.	*FKO	Koshun, Formosa.
LA	Los Angeles, Calif.	*FNA	Naha, Japan.
†DI	San Diego, Calif	*FKA	Kagoshima, Japan.
SPO	Spokane, Wash.	*FTO	Tokio, Japan.
*WW	Walla Walla, Wash.	*FNE	Nemuro, Japan.
BA	Baker, Oreg.		

*Cloud reports not included.
†Stations with which upper air observations are sent Such observations, taken in the afternoon, are always included in the 7:30 p. m. bulletin; those taken in the early morning are included in the 9 a. m. bulletin when received in time.

The stations are indicated by one or more key-letters which are followed by one or more 5-unit groups of figures. Additional groups containing upper air data are included only in the reports from stations marked with a dagger (†).

The letter "X" will be substituted for any missing or unavailable data.

The location of the aerological stations, the service that conducts them, and the surface stations with which the data are coded are as follows:

Aerological stations	Conducted by	Surface stations, with which upper air reports are included
North Island, Calif.	U. S. Navy	San Diego, Calif.
San Francisco, Calif.	U. S. Weather Bureau	San Francisco, Calif.

SECOND PART

The second part of the bulletin is in plain language and consists of a summary of general pressure distribution; wind and weather forecasts for ocean zones (see chart, page 4) for a period of 24 hours beginning at noon on day of issue‡; storm warnings; and flying forecasts by zones (see chart, page 4) for a period from noon to midnight of day of issue.§

‡ Midnight to midnight in the p. m. bulletin.
§ Forenoon of following day in p. m. bulletin.

EXPLANATION OF GROUPS

First group (surface).—*Barometric pressure* reduced to sea-level and expressed in three figures; *wind direction* expressed in one figure; and *wind force* (Beaufort scale) expressed in one figure.

Second group (surface).—*State of weather* expressed in one figure; *barometric tendency* (rise or fall in hundredths of an inch during two hours immediately preceding the observation) expressed in one figure; *past weather* during the preceding 12 hours expressed in one figure; and *current temperature* expressed in two figures.

Third group (clouds).—*Prevailing upper clouds* expressed in one figure; *direction of upper clouds* expressed in one figure; *prevailing lower clouds* expressed in one figure; *direction of lower clouds* expressed in one figure; and *amount of lower clouds* expressed in one figure. Cloud reports are not received from Alaskan, Canadian, foreign, and some United States stations. (See list of key-letters and stations.)

||**Fourth group** (upper air).—Two levels are included in this group, 250 meters and 500 meters. The first figure (4) identifies the group; the second figure indicates the wind direction at the lower elevation, and the third figure the wind force at the lower elevation; the fourth and fifth figures represent, respectively, the wind direction and force at the higher elevation.

||**Fifth group** (upper air).—Includes 1,000 and 1,500 meter elevations; same arrangement of the five significant figures as in the fourth group.

||**Sixth group** (upper air).—Includes 2,000 and 3,000 meter elevations; same arrangement of the five significant figures as in the fourth group.

||**Seventh group** (upper air).—Includes 4,000 meter elevation; same arrangement as in the fourth group, except that there will be only three figures in this group, followed by XX, as elevations in excess of 4,000 meters are reported only in the last group.

|| Position order will be one less when there is no cloud group.

Last group (upper air).—Shows the highest elevation reached. The first figure (8) identifies the group as the one showing the maximum altitude (it may be the fifth, sixth, seventh, or eighth group, dependent upon the actual elevation reached); the second and third figures indicate the eleva-

tion in hundreds of meters; the fourth and fifth figures, wind direction and velocity, respectively, at the indicated elevation. When the maximum elevation is 9,900 meters or more the figures 99 will be used.

KEY TO GROUPS AND EXAMPLES

First group.

Barometric pressure (first three figures of group): Actual pressure in inches and hundreths used, except that the first figure of full reading is omitted. Thus, if the actual corrected pressure is 29.98 inches, the figures 998 are sent, or if the reading is 30.14 inches, the figures 014 are sent.

Direction of surface wind (fourth figure of group).

0=calm, or no movement.

1=north.	5=south.
2=northeast.	6=southwest.
3=east.	7=west.
4=southeast.	8=northwest.

Force of wind (fifth figure of group): Sent according to Beaufort scale, values 0 to 9, inclusive.

Beaufort scale

Scale No.	Explanatory titles	Miles per hour (statute)	Terms used in forecasts
0	Calm	Less than 1	
1	Light air	1 to 3	Light.
2	Slight breeze	4 to 7	
3	Gentle breeze	8 to 12	Gentle.
4	Moderate breeze	13 to 18	Moderate.
5	Fresh breeze	19 to 24	Fresh.
6	Strong breeze	25 to 31	Strong.
7	High wind	32 to 38	
8	Gale	39 to 46	Gales.
9	Strong gale	47 to 54	
*10 (W)	Whole gale	55 to 63	Whole gale.
*11 (S)	Storm	64 to 75	
*12 (H)	Hurricane	Over 75	Hurricane.

*The numeral code does not admit of force in excess of 9 being sent. Therefore, the letters W, S, and H will be used for wind forces 10, 11, and 12, respectively.

NOTE.—The last column gives the terms applicable to the Beaufort scale which are used in the forecasts and warnings issued by the U. S. Weather Bureau.

Example of first group as sent: 99852.

Translation: Barometric pressure, 29.98 inches; wind from south; wind force, 2 (4 to 7 statute miles per hour).

Second group.

Present weather (first figure of group): State of weather at surface at 5 a. m. and 5 p. m.

1=clear (3 tenths or less).	5=snowing.
2=partly cloudy (4 to 7 tenths).	6=thunderstorm.
3=cloudy (8 to 10 tenths).	7=sleeting or hailing.
4=raining.	8=dense fog.

Pressure change (second figure of group) in hundredths of inch during two hours preceding observation.

0=change of less than .04 inch.
1=increase of .04.
2=decrease of .04.
3=increase of .06.
4=decrease of .06.
5=increase of .08.
6=decrease of .08.
7=increase of .10.
8=decrease of .10.
†9=increase or decrease of .12 or more.

†Whether it is an increase or decrease can be obtained by barometric tendency at surrounding stations.

Past weather (third figure of group): Information concerning occurrence of thunderstorms, high winds (40 miles per hour or more) and precipitation during the preceding 12 hours.

1=Thunderstorm without high winds and less than .06 inch precipitation.
2=Thunderstorm without high winds and with .06 inch or more precipitation.
3=Thunderstorm with high winds and less than .06 inch precipitation.
4=Thunderstorm with high winds and .06 inch or more precipitation.
5=Precipitation less than .06 inch.
6=Precipitation from .06 to .16 inch, inclusive.
7=Precipitation more than .16 inch.
8=High winds without thunderstorm and without precipitation in excess of .06 inch.
9=High winds without thunderstorm and with precipitation in excess of .06 inch.
0=No precipitation or high winds.

Current temperature (fourth and fifth figures of group): Temperatures are reported in even degrees, Fahrenheit. When the temperature is zero or 100°, the fourth and fifth figures will be 00; when between 2° and 8°, inclusive, the fourth figure will be 0 and the fifth figure the temperature; when below zero, complementary figures will be used (subtract coded temperature sent from 100° to obtain correct temperature). The significant figure 1 is omitted for temperatures of 100° or more. No confusion should arise in determining below zero and above 100° temperatures when the season of the year and the location of the reporting stations are considered.

Examples of temperature coded for stations which may be 100° or more in summer and below zero in winter:

(Eagle) EA 62= 62° in summer and −38° in winter.
(Calgary) CY 00=100° in summer and zero in winter.
(Boise) BS 08=108° in summer and 8° in winter.

Example of groups as sent and as translated:

52798: Snowing; pressure change, decrease of .04 inch during preceding two hours; precipitation more than .16 inch; current temperature, −2° (if in winter).

21374: Partly cloudy weather; pressure change, increase of .04 inch during preceding two hours; thunderstorm with high winds and less than .06 inch precipitation; current temperature, 74°.

Third group.

Upper clouds (first figure of group).

0=1 tenth clouds or less (kind not indicated).
1=Cirrus or cirro-stratus moving slowly.
2=Cirrus or cirro-stratus moving rapidly.
3=Cirro-cumulus or alto-cumulus moving slowly.
4=Cirro-cumulus or alto-cumulus moving rapidly.
5=Alto-stratus moving slowly.
6=Alto-stratus moving rapidly.

Direction of upper clouds (second figure of group).

0=calm, or no movement.

1=north.	5=south.
2=northeast.	6=southwest.
3=east.	7=west.
4=southeast.	8=northwest.

Lower clouds (third figure of group).

0=1 tenth clouds or less (kind not indicated).
1=Strato-cumulus moving slowly.
2=Strato-cumulus moving rapidly.
3=Cumulus moving slowly.
4=Cumulus moving rapidly.
5=Stratus moving slowly.
6=Stratus moving rapidly.
7=Nimbus or cumulo-nimbus moving slowly.
8=Nimbus or cumulo-nimbus moving rapidly.

Direction of lower clouds (fourth figure of group).

(Same key as for movement of upper clouds.)

Amount of lower clouds (fifth figure of group). Number of tenths of the sky obscured.

0=1 tenth or less of sky covered.
2=2 to 3 tenths of sky covered.
4=4 to 5 tenths of sky covered.
6=6 to 7 tenths of sky covered.
8=8 to 10 tenths of sky covered.

When upper and lower clouds are indicated, the amount of the former can be determined approximately by the difference between the *amount of lower clouds* (fifth figure of third group) and the amount of sky obscured as shown in *state of weather* (first figure of second group).

Example of group as sent: 36244.

Translation: Cirro-cumulus or alto-cumulus moving slowly from the southwest; strato-cumulus moving rapidly from the southeast; and 4 to 5 tenths of sky obscured with lower clouds.

The upper air observations are included in five groups and have identifying numbers 4 to 8, inclusive. The wind direction and force are indicated by the same numerals as for surface wind direction and force.

Fourth group.—(Five figures) 250 and 500 meter levels. The identifying figure for this group is 4, and is always the first figure of the group. The second figure is direction of wind at 250 meters and the third figure is wind force at 250 meters. The fourth figure is wind direction at 500 meters and the fifth figure is wind force at 500 meters.

Example: 45163.

Translation: Observations at 250 and 500 meter levels; wind blowing from south with force 1 (1 to 3 statute miles per hour) at 250 meters; wind blowing from southwest with force 3 (8 to 12 statute miles per hour) at 500 meters.

Fifth group (1,000 and 1,500 meters), sixth group (2,000 and 3,000 meters), and seventh group (4,000 meters), have the same arrangement as group four, except that group seven

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will have only three figures followed by XX, the first figure, 5, 6, and 7, respectively, always identifying the group.

Last group.—(highest elevation reached). The first figure (8) identifies the group; the second and third figures indicate the elevation in multiples of 100 meters; the fourth and fifth figures show wind direction and force, respectively, at that elevation.

Examples: (*a*) 81785, (*b*) 81954, (*c*) 89979.

Translation:

(*a*) Highest elevation reached 1,700 meters; wind blowing from northwest with force 5 (19 to 24 statute miles).

(*b*) Highest elevation reached, 1,900 meters; wind blowing from south with force 4 (13 to 18 statute miles).

(*c*) Highest elevation reached, 12,000 meters; wind blowing from west with force 9 (47 to 54 statute miles).

Ship reports are included in the first part of the bulletin immediately following the land stations. They are included in two groups, preceded by the call letters identifying the ship. The first group consists of five numerals, signifying the ship's position, and the second group of five numerals expressing the barometric pressure, wind direction and force. In the group giving the ship's position (to the nearest degree), the first two numerals express the latitude (north) and the last three the longitude (west).

Example: WMR 31140 00645.

Translation: S. S. *Maui*; Latitude 31 degrees north; longitude 140 degrees west. Barometric pressure 30.06 inches; wind from the southeast; wind force of 5 (19 to 24 miles per hour).

PERIOD COVERED BY FORECASTS

In a. m. bulletins:

Wind and weather forecasts; 24 hours, beginning at noon.

Flying weather forecasts; 12 hours, noon until midnight.

In p. m. bulletins:

Wind and weather forecasts; 24 hours, beginning at midnight.

Flying weather forecasts; 12 hours, midnight until noon.

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

CORRECTION SLIP

This slip is to be attached or pasted to the similar portion on page 3 of Circular No. 10—Radio—(Second Edition—Revised) dated May 15, 1925.

(CUT HERE)

SCHEDULE OF BROADCASTS

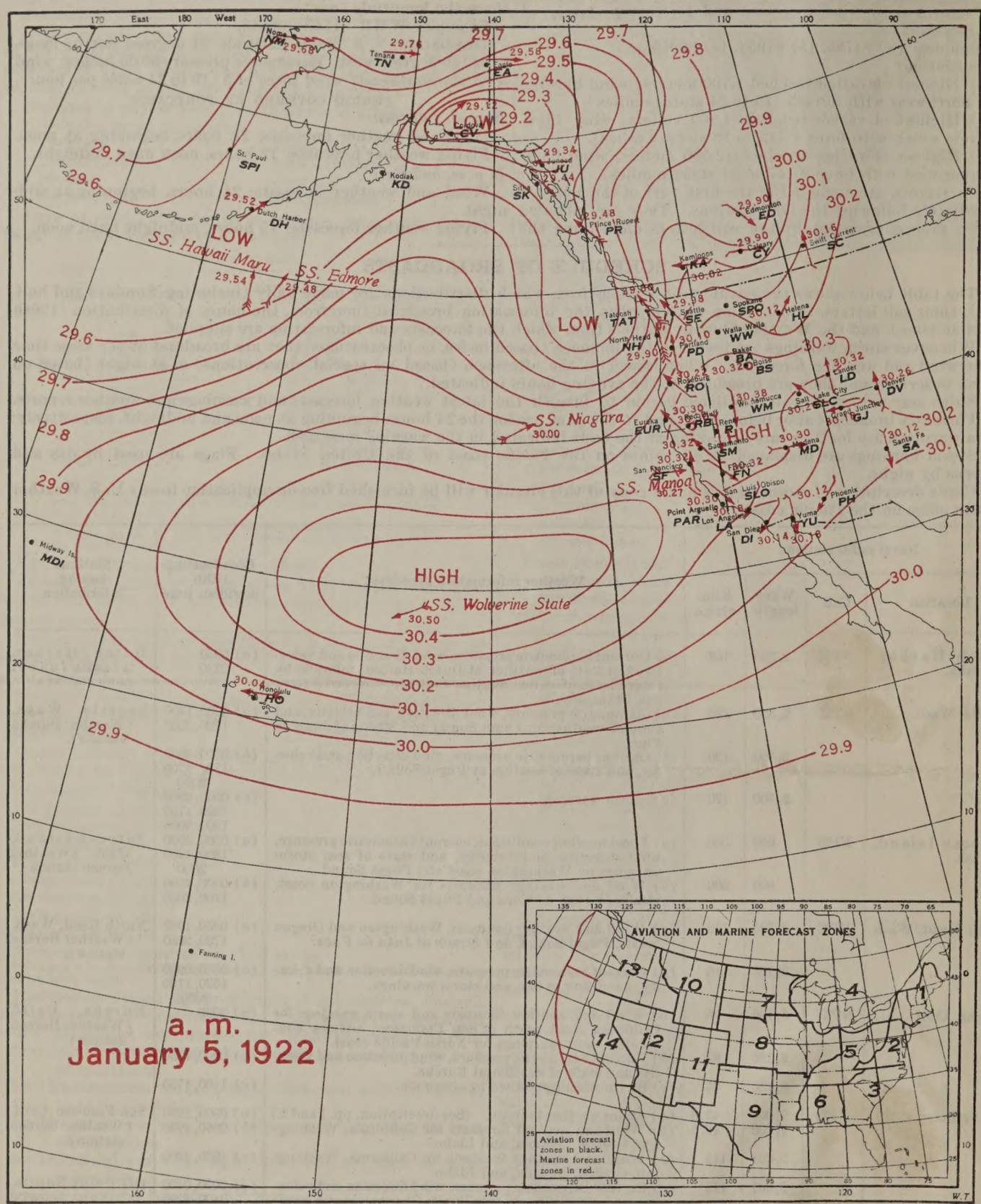
dio stations from which distributions are made daily (including Sundays and holi-
ve lengths, the information broadcast therefrom, the hours of distribution (120th
u stations from which the forecasts and information are supplied.
l in the forenoon (based on 5 a. m. observations) they are broadcast at the same time
en issued in the afternoon (based on special observations) or at night (based on
at the evening hours indicated.
l herein to furnish the latest weather forecasts and warnings and weather reports.
a and in the p. m. are for the 24 hours beginning at noon and midnight, respectively;
ng at the hour indicated in the warning messages.
points on the Pacific coast of the United States. Flags are used by day and

nd a copy of this circular will be furnished free on application to any U. S. Weather

Naval radio stations

Location	Call	Wave length	Kilocycles	Weather information broadcast	Broadcasting 120th meridian time	Stations issuing information
Dutch Harbor, Alaska.	NPR	2,254	133	(*a*) Current barometric pressure, wind direction and velocity, and state of weather at Dutch Harbor, followed by rebroadcast of major weather bulletin as received from San Francisco.	(*a*) 0930 2130	Dutch Harbor, Alaska (naval radio station).
Seattle, Wash.....	NPC	2,499	120	(*a*) Barometric pressure, wind direction and velocity, and state of weather in Puget Sound and Straits of Juan de Fuca.	(*a*) 0900, 1300 1700, 2000	Seattle, Wash. (Weather Bureau station).
		2,499	120	(*b*) Current barometric pressure, wind direction and velocity, and state of weather at Puget Sound.	(*b*) 0500, 0900 1300, 1700 2000	
		2,499	120	(*c*) Storm warnings.	(*c*) 0500, 0900 1300, 1700 1900, 2000	
Tatoosh Island, Wash.	NPD	799.5	375	(*a*) Local weather conditions, current barometric pressure, wind direction and velocity, and state of sea; storm warnings on Washington coast and Puget Sound.	(*a*) 0500, 0900 1300, 1700 2000	Tatoosh Island, Wash. (Weather Bureau station).
		799.5	375	(*b*) Wind and weather forecasts for Washington coast, Straits of Juan de Fuca and Puget Sound.	(*b*) 0900, 1300 1700, 2000	
North Head, Wash.	NPE	2,726	110	(*a*) Wind and weather forecasts, Washington and Oregon coasts, Puget Sound, and Straits of Juan de Fuca.	(*a*) 0930, 1330 1730, 2030	North Head, Wash. (Weather Bureau station).
		2,726	110	(*b*) Current barometric pressure, wind direction and velocity, condition of bar, and storm warnings.	(*b*) 0530, 0930 1330, 1730 2030	
Eureka, Calif.....	NPW	3,156	95	(*a*) Wind and weather forecasts and storm warnings for California coast north of San Francisco; advices concerning storm warnings for North Pacific coast.	(*a*) 0900	Eureka, Calif. (Weather Bureau station).
		3,156	95	(*b*) Current barometric pressure, wind direction and velocity, and state of weather at Eureka.	(*b*) 0900, 1730	
		3,156	95	(*c*) Storm warnings issued in afternoon.	(*c*) 1400, 1730	
San Francisco, Calif..	NPG	7,005	42.8	(*a*) Major weather bulletin. (See description, pp. 1 and 2.)	(*a*) 0900, 1930	San Francisco, Calif. (Weather Bureau station).
		7,005	42.8	(*b*) Wind and weather forecasts for California, Washington, Oregon, Nevada, and Idaho.	(*b*) 0900, 1930	
		2,607	115	(*c*) Wind and weather forecasts for California, Washington, Oregon, Nevada, and Idaho.	(*c*) 1930, 2200	
		2,607	115	(*d*) Current barometric pressure, wind direction and velocity, and state of weather in Bonita Channel; storm warnings for northern California Coast.	(*d*) 0000, 0400 0800, 1200 1600, 2000	(*d*) Point Bonita, Coast Guard Lookout.
San Diego, Calif....	NPL	2,988	100	(*a*) Southern California forecast and local weather conditions (barometric pressure, temperature, weather, force and direction of wind).	(*a*) 0830	San Diego, Calif. (Weather Bureau station).
		2,988	100	(*b*) Local weather conditions.	(*b*) 1400, 2030	
		2,988	100	(*c*) Storm warnings and advisory warnings.	(*c*) On receipt and at 0800, 1200 2200	
Honolulu, T. H.....	NPM	2,254	133	(*a*) Forecasts of wind and weather for Hawaiian Islands and neighboring ocean areas.	(*a*) 1430	Honolulu, T. H. (Weather Bureau station).
		2,254	133	(*b*) Current barometric pressure, wind direction and velocity, and state of weather at Honolulu. NOTE.—No broadcasts from Honolulu on Sundays and holidays.	(*b*) 1030, 1430 2230	

CHART SHOWING HOW WEATHER REPORTS BROADCAST IN MAJOR BULLETINS MAY BE ENTERED AND USED IN THE PREPARATION OF WEATHER MAPS AT SEA



This map shows conditions that obtained in the a. m. of January 5, 1922, and is made up of data distributed by radio. Three elements are shown (in red) for each station and ship: Barometric pressure in inches, indicated by figures; wind direction, shown by arrow which flies with the wind; and wind force (Beaufort scale), indicated by the number of feathers on the arrow. The red lines are isobars that pass through points having equal barometric pressure, and were drawn from inspection after the pressure values were entered. The centers of areas of low pressure are indicated by the word LOW and centers of high pressure by the word HIGH.

In the Northern Hemisphere winds blow spirally inward, counter-clockwise, toward and around the center of a LOW, while from the center of a HIGH they blow spirally outward in a direction similar to that described by the hands of a clock. The steeper the pressure gradient (that is, the closer the isobars are together) the higher are the wind velocities.

Copies of this base chart (size, $8\frac{3}{4}$ by $11\frac{1}{2}$ inches) will be supplied free to vessel masters who regularly take and forward weather observations to the U. S. Weather Bureau, or to the Hydrographic Office, U. S. Navy.